



United States Department of Agriculture

Update on GOES and Landsat Active Fire Product Enhancement Requests for LANCE/FIRMS

NASA LANCE User Working Group Telecon
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United States Department of Agriculture, Forest Service

GOES 16/17 Active Fire Request Background

- Question to the LANCE UWG in October 2017
 - Interest/plan by NASA to develop a GOES-16/17 active fire product?
 - Is there interest by LANCE to disseminate a NASA GOES-16/17 active fire product via FIRMS?
- Feedback from LANCE UWG in October 2017
 - Can NOAA provide this service to the user community?
- Forest Service Activities
 - Track and seek periodic updates from NOAA and CIMSS staff on NOAA GOES 16/17 active fire algorithm performance status and updates



GOES 16/17 Active Fire Product

- Fire Detection and Characterization (FDC) product
- Based on the legacy GOES WF-ABBA algorithm
- Spatial resolution: 2km
- Temporal resolution:
 - 5 minute intervals for CONUS
 - 10 minute intervals for full disk
- Fire characterization:
 - Fire size and temperature
 - FRP
 - Detection confidence

Information courtesy of NOAA, CIMSS and CIRA



GOES FDC Data Provisioning Services

year	month	day	hh	mm	Lon	Lat	Area	Temp	Power	Fireflg
2019	10	21	23	00	-121.554214	37.912216	83456.9375	513.	154.414230	30
2019	10	21	23	00	-110.107681	27.444212	-999.0000	-999.	37.939766	34
2019	10	21	23	00	-108.950653	26.201597	29184.7402	477.	31.307295	10
2019	10	21	23	00	-112.086960	35.094929	-999.0000	-999.	-999.000000	32
2019	10	21	23	00	-106.065811	22.899326	-999.0000	-999.	-999.000000	35
2019	10	21	23	00	-106.059258	22.878111	-999.0000	-999.	-999.000000	35
2019	10	21	23	00	-106.033867	22.877201	-999.0000	-999.	-999.000000	35
2019	10	21	23	00	-110.350945	34.321018	72053.6797	462.	60.789959	30
2019	10	21	23	00	-110.153320	34.186802	15952.0801	573.	63.689800	30
2019	10	21	23	00	-109.681213	33.718983	76993.0625	482.	89.915939	30
2019	10	21	23	00	-100.864723	39.876823	56381.8203	507.	96.557953	30
2019	10	21	23	00	-93.184769	17.894596	-999.0000	-999.	-999.000000	32
2019	10	21	23	00	-95.989525	33.690086	9549.1797	565.	34.608326	30
2019	10	21	23	00	-88.821358	18.360846	-999.0000	-999.	38.770607	30
2019	10	21	23	00	-88.819458	18.341106	-999.0000	906.	36.468513	30
2019	10	21	23	00	-78.508331	2.284375	-999.0000	-999.	-999.000000	15

- Provisional GOES 16 FDC available from NOAA NESDIS

- CONUS and Full Disk products available

- Analyst-validated GOES 16 FDC output integrated into operational HMS product

NOAA OFFICE OF SATELLITE AND PRODUCT OPERATIONS
NATIONAL ENVIRONMENTAL SATELLITE, DATA, AND INFORMATION SERVICE

ORGANIZATION SERVICES PRODUCTS OPERATIONS

Hazard Mapping System Fire and Smoke Product

Current Analysis

Analysis for day 10/21/2019 last updated Oct 22, 2019 03:11:15 GMT

Fire Attributes: YearDay: 2019294 Time: 1920 Satellite: GOES-EAST Method of Detection: FDC

Zoom to

Fire Points
Smoke: ■ Light ■ Medium ■ Heavy

Fire KMZ Smoke KMZ

Disclaimer: The location of the fires displayed may be slightly offset from the actual fire location due to satellite resolution.

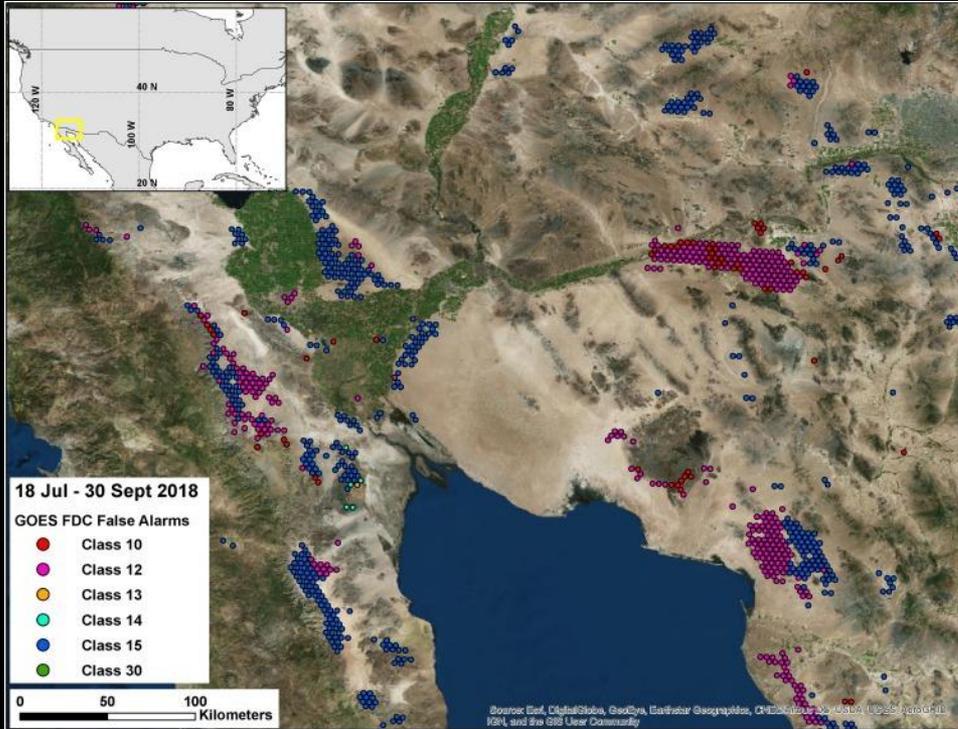
[Archived Fire Products \(6 months\)](#) [Smoke Text Product | Archive](#)

Download GIS files from <https://satepsanone.nesdis.noaa.gov/pub/FIRE/HMS/GIS/>

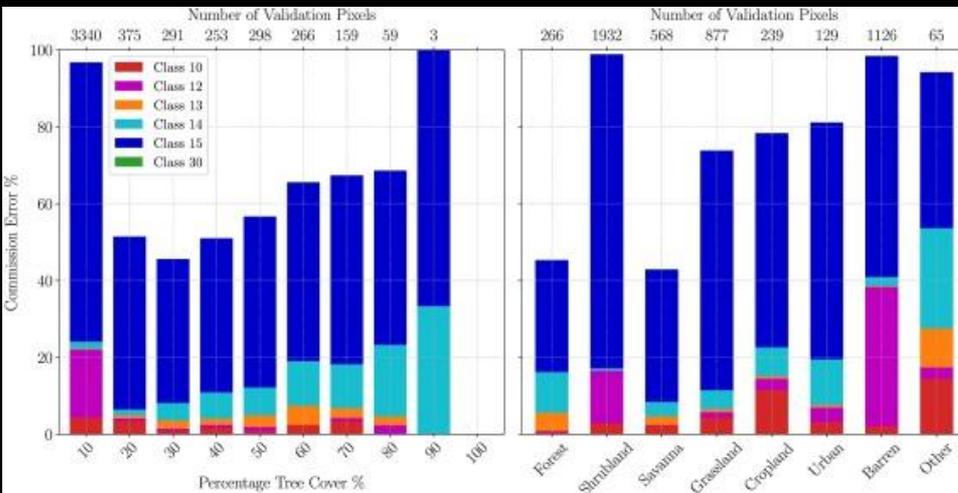
Information courtesy of NOAA and CIMSS



GOES FDC Reliability and Performance



- Significant commission error rates
 - FDC V1 false positive rate:
 - 70%-90% for low to high confidence classes
 - ~35% for fully processed
 - FDC V2 false positive rate:
 - ~20% in medium, high and fully processed confidence classes
 - >80% in low confidence class
- Some improvement in commission error for FDC V2, but higher omission errors



Information courtesy of Hall et al. 2019, NOAA and CIMSS



GOES FDC Summary/Recommendations

- FDC currently not an acceptable product for operational use
 - Not of the same quality and reliability as MODIS/VIIRS active fire products
 - Recommend not to integrate current FDC products into LANCE/FIRMS
- Revision to FDC continues, but timeline to a reliable operational product is unknown
 - Need to support efforts to facilitate a GOES NRT algorithm/product suitable for the operational community
 - Possibilities for NOAA to accelerate improvement of FDC?
 - NASA opportunities to develop and support an algorithm and product?



L8 Active Fire Request Background

- Questions to the LANCE UWG in October 2017
 - Interest by LANCE to make available and disseminate the Landsat 8 active fire product via FIRMS?
 - Logical processing element to provide an operational, low latency product?
- Feedback from LANCE UWG in October 2017
 - Can the active fire algorithm / product be integrated into the USGS EROS operational Landsat data processing workflow?
- Forest Service Activities
 - Engage USGS EROS Science and Applications Branch and Ground Station Management POCs
 - Discussions still ongoing to find pathways to reduce data latency, including onsite operational production of L8 data



L8 Active Fire Product

Fire Activity Detected By Landsat 8
● Last 0 To 6 Hours
● Last 6 To 12 Hours
● Last 12 To 24 Hours
● 6 Days Previous To Last 24 Hours
Updated: 2200 MDT

- Developed through support by the NASA Applied Sciences Program
- Spatial resolution: 30m
- Input data: Landsat L1T OLI
- Temporal resolution: 16 days
- Fire characterization: Detection confidence

Palisades Fire
October 21, 2019
Landsat 8 Active Fire (30m)
18:28 UTC



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L8 Active Fire Data Processing/Provisioning



- GTAC pulls daily L1T data from USGS EROS
- GTAC processes and disseminates U.S. / Canada data
 - GIS data
 - KMLs
 - WMS services
- Data processing conducted with PIs and NASA DRL



L8 Active Fire Collaboration with USGS EROS

- EROS responses to submitted requests
 - Reduction of latency for source L1T data?
 - Will continue to attempt to reduce for US and Canada as part of their Optimized Tiered Data Processing System (DPS) over the longer term.
 - Latency of L1T data has been improving (3-5 hours).
 - Onsite execution of L8 active fire algorithm?
 - Very possible. However, further discussion is needed to ensure it is run in a suitable processing framework from the NASA LANCE and EROS perspective.
 - May require an IAA to address production costs.
 - LANCE processing element?
 - Possibly. May require an IAA to address data staging and dissemination costs.



L8 Active Fire Summary/Recommendations

- Leverage opportunities to continue reducing data latency and increasing availability of the Landsat 8 active fire product
 - Improving latency of source L1T data
 - Potential onsite data processing at EROS
 - LANCE processing element at EROS is a possibility
- Funding and an IAA may be necessary to address potential costs and define agency roles
- GTAC plans to continue processing Landsat 8 data for US and Canada after it migrates to the NASA GSFC environment
 - Potential synergies with planned active fire data processing using Sentinel 2A/2B and Landsat 9





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Thanks!

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